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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,948	02/11/2004	Roger E. Weiss	15876-46038	4260

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EXAMINER

LEVI, DAMEON E

ART UNIT	PAPER NUMBER
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2841

DATE MAILED: 08/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/776,948	Applicant(s) WEISS, ROGER E.	
	Examiner Dameon E. Levi	Art Unit 2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claim 18 is objected to because of the following informalities: there is insufficient antecedent basis for ... "spanning the well". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-6, and 14-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Poo et al US Patent 6582992.

Regarding claim 1, Poo et al discloses a packaged device comprising:

- a plurality of vertically spaced electrical devices[for example, see elements 10, (10 A, B, C, D-1), 10 (10 A, B, C, D-2), 10 (10 A, B, C, D-3), Figs 2-7];

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- a layer of anisotropic conductive elastomer (ACE)[for example see elements 58, 60, 62, Figs 2-7, and see column 6, lines 20-35] electrically interconnected between each electrical device and each immediately adjacent electrical device, the ACE layers providing electrical connection through the package to at least contribute to a vertical electrical bus, and also conduct heat from the electrical devices[for example see elements 42A,B,C Figs 2-7, and see column 6, lines 20-35] ;
- one or more spacer members[for example, see elements 36, 36A, B, C, Figs 2-7] that define one or more wells into which electrical devices can be placed, the spacer members each comprising a support for at least one electrical device; and
- a device[for example, see column 11, lines 50-55] for applying a releasable compressive load to each of the ACE layers.

Regarding claim 2, Poo et al discloses further comprising at least one substrate[for example, see elements 52,52A,B,C, Figs 2-7]for supporting and electrically connecting to the electrical devices.

Regarding claim 3, Poo et al discloses further comprising a layer of ACE[for example, see element s 62, Fig 3] electrically interconnected between the substrate and the electrical device closest to the substrate.

Regarding claim 4, Poo et al discloses wherein the substrate comprises a printed circuit board[for example, see elements 52,52A,B,C, Figs 2-7].

Regarding claim 5, Poo et al discloses wherein, wherein the spacer

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members are electrically connected to the vertical bus[for example, see elements 42, 42A, B, C, 38, 38A, B, C, Figs 2-7, see column 5, lines 22-30].

Regarding claim 6, Poo et al discloses wherein the electrical connection of the spacer members are accomplished using ACE[for example see elements 58, 60, 62, Figs 2-7].

Regarding claim 14, Poo et al discloses wherein the spacer members carry electrical signals[for example, see elements 36, 36A, B, C, Figs 2-7].

Regarding claim 15, Poo et al discloses wherein the package comprises a number of vertically adjacent layers, (10 A, B, C, D-1), 10 (10 A, B, C, D-2), 10 (10 A, B, C, D-3), Figs 2-7]; each layer comprising a spacer member[for example, see elements 36, 36A, B, C, Figs 2-7].

Regarding claim 16, Poo et al discloses wherein ACE layers electrically interconnect the vertically spaced spacer members[for example see elements 58, 60, 62, Figs 2-7, and see column 6, lines 20-35].

Regarding claim 18, Poo et al discloses a device package comprising:

- at least one substrate[for example, see elements 52, 52A, B, C, Figs 2-7] for supporting and electrically connecting to the electrical devices,
- a series of vertically-adjacent spacer members[for example, see elements 36, 36A, B, C, Figs 2-7] together defining a stack area in which the electrical devices are located, the spacer members each comprising a support layer spanning the well, and supporting and electrically connecting to at least one electrical device;

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- a layer of ACE between each spacer member and each immediately adjacent spacer member[for example see elements 58, 60, Figs 2-7, and see column 6, lines 20-35] ,
- a layer of ACE between the substrate and the spacer member closest to the substrate[for example see elements 62, Figs 2-7, and see column 6, lines 20-35] ,wherein the ACE layers provide electrical connection through the package, and also conduct heat from the electrical devices; and
- a device[for example, see column 11, lines 50-55] for applying a compressive load to each of the ACE layers.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-9, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poo et al US Patent 6582993 in view of Tutsch et al US Patent 6380616.

Regarding claim 7, Poo et al discloses the instant claimed invention except wherein the spacer members further comprise a heat-conductive element within the support, to conduct heat laterally away from the electrical device.

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Tutsch et al discloses a device package wherein the spacer members further comprise a heat-conductive element within the support, to conduct heat laterally away from the electrical device(for example, see elements 4, Figs 1-9, and see column 5, lines 30-37). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a heat conductive element as taught by Tutsch et al in the device package as taught by Poo et al as such arrangements are known to be used to optimize the heat removal from the device package (see Tutsch et al)

Regarding claim 8, Poo et al discloses wherein the spacer members further comprise electrical conductors in electrical contact with the supported device(for example, see elements 40, 40A,B,C, Figs 2-7).

Regarding claim 9, Poo et al discloses the instant claimed invention except further comprising a heat-exchange device coupled to the heat-conductive elements.

Tutsch et al discloses a device package comprising a heat-exchange device coupled to the heat-conductive elements(for example, see elements 17, Figs 1-9, and see column 13, lines 45-60).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a heat exchange device as taught by Tutsch et al in the device package as taught by Poo et al in order to handle heat distribution within the device(see Tutsch et al).

Regarding claim 17, Poo et al discloses the instant claimed invention except , wherein the spacer members comprise vertically thickened portions outside of the stack area, to create wells for the electrical devices.

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Tutsch et al discloses a device package assembly wherein the spacer members comprise vertically thickened portions outside of the stack area, to create wells for the electrical devices(for example, see elements 3A, Figs 1-9).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the spacer members in the manner as taught by Tutsch et al in the device assembly as taught by Poo et al as such arrangements are known in the art of assembling vertically stacked multi chip modules.

Regarding claim 19, Poo et al discloses the instant claimed invention except , wherein the spacer members comprise vertically thickened portions outside of the stack area, to create wells for the electrical devices.

Tutsch et al discloses a device package assembly wherein the spacer members comprise vertically thickened portions outside of the stack area, to create wells for the electrical devices(for example, see elements 3A, Figs 1-9).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the spacer members in the manner as taught by Tutsch et al in the device assembly as taught by Poo et al as such arrangements are known in the art of assembling vertically stacked multi chip modules.

Claims 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poo et al US Patent 6582993 in view of Ghoshal US Patent 6474074.

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Regarding claim 20, Poo et al discloses the instant claimed invention except wherein at least one spacer member further comprises a heat-conductor for carrying heat away from the supported device.

Ghoshal discloses a device package assembly wherein at least one spacer member further comprises a heat-conductor for carrying heat away from the supported device(for example, see elements 750, Fig 7A, 7B).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a heat conductor as taught by Ghoshal in the device package as taught by Poo et al in order to remove heat from the device during operation (see Ghoshal).

Regarding claim 21, Poo et al discloses the instant claimed invention except further comprising a heat sink in thermal contact with the one or more of the heat conductors of one or more of the spacer members, to help dissipate heat from the devices.

Ghoshal discloses a device assembly comprising a heat sink in thermal contact with the one or more of the heat conductors of one or more of the spacer members, to help dissipate heat from the devices(for example, see elements 760, 750, figs 7A, 7B).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a heat sink in contact with a heat conductor as taught by Ghoshal in the device package assembly as taught by Poo et al in order to effectively dissipate heat during operation(see Ghoshal).

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Regarding claim 22, Poo et al discloses the instant claimed invention except further comprising one or more heat pipes in thermal contact with one or more of the spacer members, to help dissipate heat from the spacer members.

Ghoshal discloses a device assembly comprising one or more heat pipes in thermal contact with one or more of the spacer members, to help dissipate heat from the spacer members (for example, see elements 750, 770, Figs 7A, 7B).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included heat pipes as taught by Ghoshal in the device package as taught by Poo et al in order to remove heat from the device during operation (see Ghoshal).

Regarding claim 23 Poo et al discloses the instant claimed invention except further comprising a heat exchanger employing a flowing liquid in thermal contact with one or more of the spacer members.

Ghoshal discloses a device assembly comprising a heat exchanger employing a flowing liquid in thermal contact with one or more of the spacer members (for example, see Figs 1,3,5).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a heat exchange device employing a flowing liquid as taught by Ghoshal in the device package as taught by Poo et al for the purpose of removing heat from the device package (see Ghoshal column 2, lines 28-58)

Regarding claim 24, Poo et al discloses a device package assembly comprising:

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- a plurality of vertically-spaced electrical devices[for example, see elements 10, (10 A, B, C, D-1), 10 (10 A, B, C, D-2), 10 (10 A, B, C, D-3), Figs 2-7];
- a layer of anisotropic conductive elastomer (ACE) [for example see elements 58, 60, 62, Figs 2-7, and see column 6, lines 20-35] electrically interconnecting each electrical device to each immediately adjacent electrical device, the ACE layers providing electrical connection through the package to at least contribute to a vertical electrical bus, [for example see elements 42A,B,C Figs 2-7, and see column 6, lines 20-35] and also conduct heat from the electrical devices;
- a device [for example, see column 11, lines 50-55] for applying a releasable compressive load to each of the ACE layers.

Ghoshal discloses a device package assembly comprising:

- one or more support layers that each support and electrically connect to at least one electrical device support layers comprising a heat-conductive element(for example, see elements 740, 730, Figs 7A,7B) to conduct heat laterally away from the supported electrical devices;
- one or more heat pipes(for example, see elements 750,770 Figs 7A,7B), the thermally coupled to the heat-conductive elements of the support layers;

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a heat conductive element including a heat pipe as taught by Ghoshal in the Device package assembly as taught by Poo et al in order to effectively dissipate heat from the assembly during operation(see Ghoshal, Figs 1-7B)

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Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poo et al US Patent 6582993 in view of Tutsch et al US Patent 6380616 and further in view of Ghoshal US Patent 6474074.

Regarding claim 10, Poo et al and Tutsch et al disclose the instant claimed invention except wherein the heat-exchange device comprises one or more heat pipes.

Ghoshal discloses an assembly wherein the heat-exchange device comprises one or more heat pipes(for example, see elements 750, 770, Figs 7A, 7B).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included heat pipes as taught by Ghoshal in the device package as taught by Poo et al and Tutsch et al in order to remove heat from the device during operation (see Ghoshal).

Regarding claim 11, Poo et al and Tutsch et al disclose the instant claimed invention except wherein the heat- exchange device comprises one or more heat sinks.

Ghoshal et al discloses an assembly wherein the heat-exchange device comprises one or more heat sinks(for example, see elements 760, Figs 7A, 7B).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a heat sink as taught by Ghoshal in the device package as taught by Poo et al and Tutsch et al as heat sinks are known to be used to dissipate heat from device packages to the ambient air(see Ghoshal).

Regarding claim 12, Poo et al and Tutsch et al discloses the instant claimed invention except wherein the heat-exchange device comprises a heat exchanger employing a flowing liquid.

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Ghoshal discloses an assembly wherein the heat-exchange device comprises a heat exchanger employing a flowing liquid(for example, see Figs 1,3,5).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a heat exchange device employing a flowing liquid as taught by Ghoshal in the device package as taught by Poo et al and Tutsch et al for the purpose of removing heat from the device package(see Ghoshal column 2, lines 28-58)

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poo et al US Patent 6582993 in view of Tutsch et al US Patent 6380616 ,in view of Ghoshal US Patent 6474074 and further in view of Yusuf et al US Patent 6256199.

Regarding claim 13, Poo et al ,Tutsch et al and Ghoshal disclose the instant claimed invention except wherein the device for applying a releasable compressive load is coupled to at least one heat pipe.

Yusuf et al discloses an apparatus wherein the device for applying a releasable compressive load is coupled to at least one heat pipe (for example, see elements 130, 106, Figs 1-7).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have coupled the compressing device to a heat pipe as taught by Yusuf in the device package assembly as taught by Poo et al, Tutsch et al and

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Ghoshal for the purpose of even further improving the heat removal characteristics of the device, as well as, to clamp the device securely.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poo et al US Patent 6582993 in view of Ghoshal US Patent 6474074 and further in view of Yusuf et al US Patent 6256199.

Regarding claim 25, Poo et al and Ghoshal disclose the instant claimed invention except wherein the device for applying a releasable compressive load is coupled to at least one heat pipe.

Yusuf et al discloses an apparatus wherein the device for applying a releasable compressive load is coupled to at least one heat pipe (for example, see elements 130, 106, Figs 1-7).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have coupled the compressing device to a heat pipe as taught by Yusuf in the device package assembly as taught by Poo et al and Ghoshal for the purpose of even further improving the heat removal characteristics of the device, as well as, to clamp the device securely.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dameon E. Levi whose telephone number is (571) 272-2105. The examiner can normally be reached on Mon.-Fri. (9:00 - 5:00).

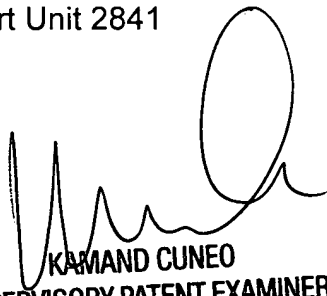
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DEL

Dameon E Levi
Examiner
Art Unit 2841



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